WHAT IS CLAIMED IS:

1. A continuous flow measurement recorder for determining and displaying water flow in an open channel, said continuous flow measurement recorder comprising:

a sensor for determining, using a measurement structure in the open channel, the pressure head of water flowing in the open channel and for producing a corresponding output signal;

a central processing unit for receiving said output signal from said sensor, for calculating total water flow in the channel based on said output signal and for producing a total flow signal based on the calculated total water flow;

a display device for receiving said total flow signal from said central processing unit and for displaying total flow based thereon; and

a single housing for housing said sensor, said central processing unit, and said display device.

2. The continuous flow measurement recorder of claim 1 wherein said sensor comprises an ultrasonic sensor and said measurement structure comprises a weir or flume.

3. The continuous flow measurement recorder of claim 1 wherein said display device comprises a liquid crystal display device.

4. The continuous flow measurement recorder of claim 1 wherein said housing comprises a top portion and a bottom portion mechanically connected to the top portion.

5. The continuous flow measurement recorder of claim 4, wherein said housing further comprises a downwardly depending member connected to said bottom portion of said housing, and wherein said sensor is received in said member.

6. The continuous flow measurement recorder of claim 1 wherein said central processing unit determines average pressure head in the channel over a predetermined period of time based on said output signal received from said sensor, and stores said average pressure head in memory and uses said stored pressure head to calculate total flow.

7. The continuous flow measurement recorder of claim 6 wherein said central processing unit stores, in memory, values for a coefficient, C, and an exponent, n, both based on the characteristics of the measurement structure used and uses said values to convert said average pressure head into a value for the flow discharge rate, Q, using the equation;

$$Q = Ch_a^n$$

where h_a is equal to the average pressure head over said predetermined period of time.

8. The continuous flow measurement recorder of claim 7 wherein said central processing unit converts the flow discharge rate, Q, into a total flow value, T_f, using the equation:

$$T_f = T_i + Qt$$

where t is equal to said predetermined period of time and T_i is a previously determined value for total flow of the beginning of period t.

9. A method for determining and displaying the total water in an open channel, said method comprising:

using a sensor to obtain a plurality of pressure head measurements for water flowing through a measurement structure in the open channel over a predetermined period of time;

using a central processing unit to determine an average pressure head measurement for the open channel for said predetermined period of time and to convert said average head measurement into a value representing total flow in the channel; and

using a liquid crystal display device housed in a common housing with said sensor and said central processing unit to display said total flow value.

10. The method of claim 9 wherein the average head measurement is converted into a value representative of the flow rate and said flow discharge rate value is converted into said total flow value.

11. The method of claim 10 wherein the average head measurement is converted into a value representative of the discharge rate Q, using the equation:

$$Q = Ch_a^n$$

where h_a is the average head measurement, and C is a coefficient, and n is an exponent, both based on the characteristics of the measuring structure used.

12. The method of claim 10 wherein the discharge rate Q is converted into a value T_f representative of total flow using the equation:

$$T_f = T_i + Qt$$

where t is said predetermined period of time and T_i is a previously determined value for total flow at the beginning of the time period t.

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